

Sociotechnical System Analysis of Weeding

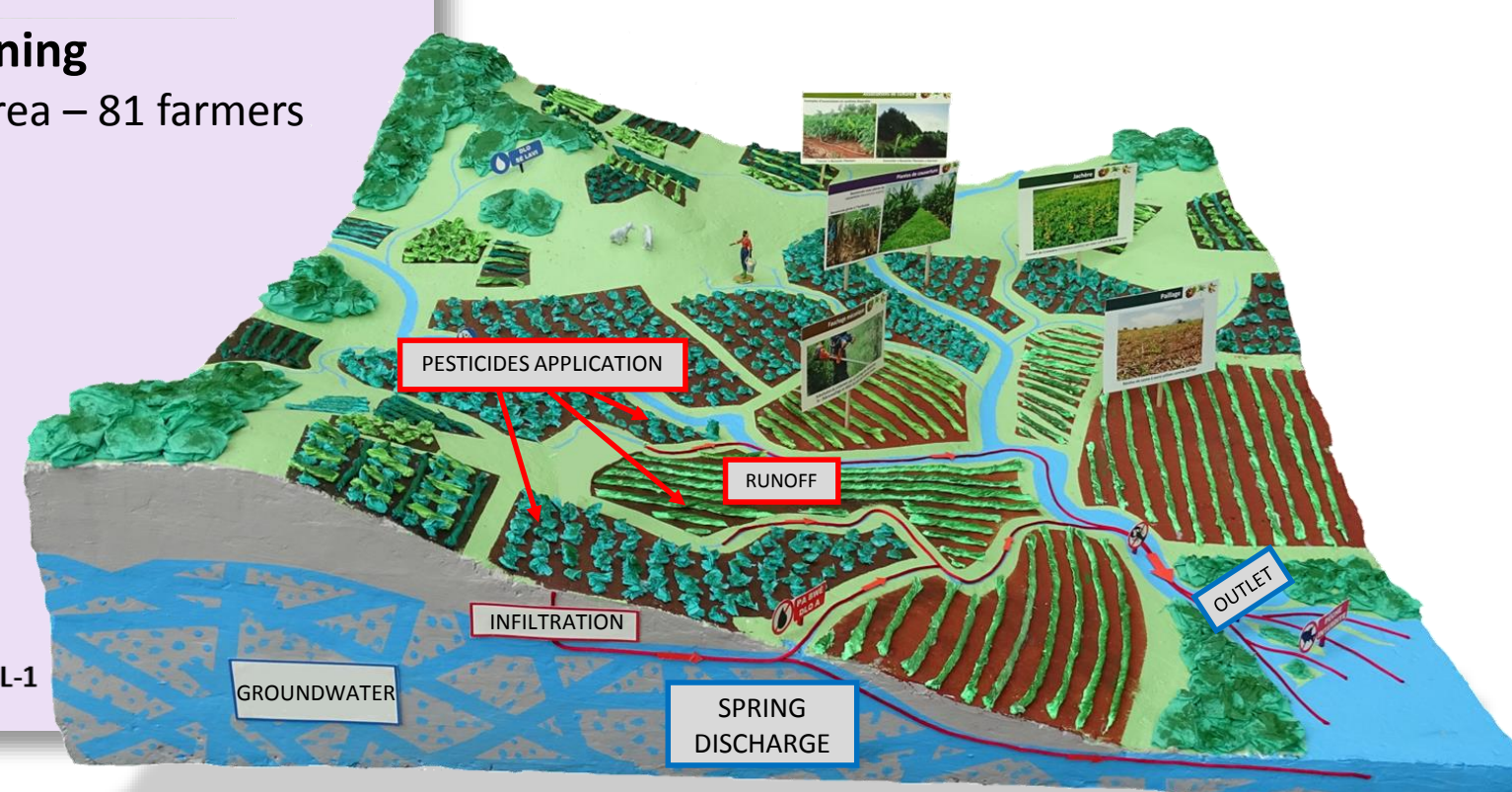
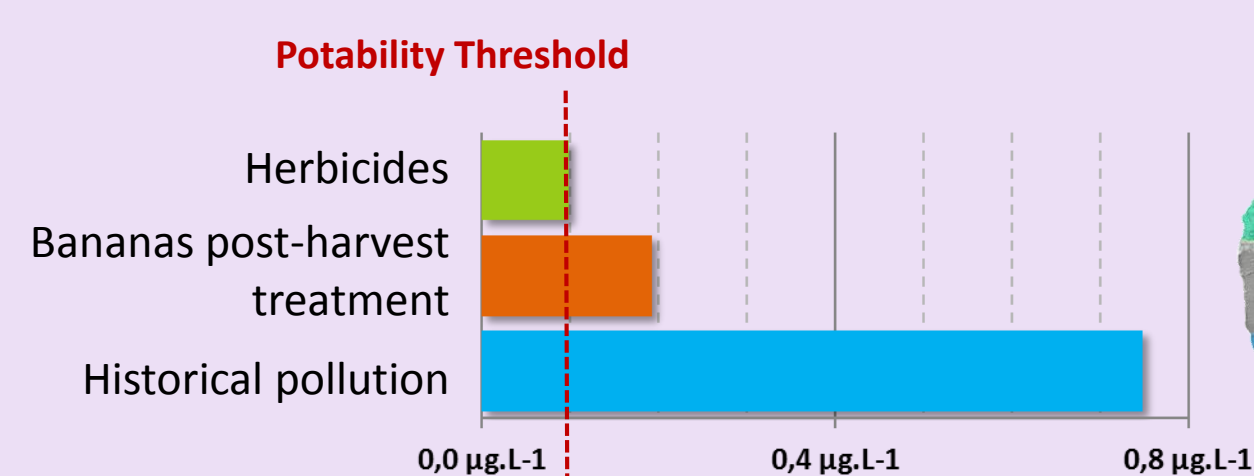
A Key Step for Designing Agro-ecological Systems at the Watershed Scale

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Studied watershed : Galion, French West Indies

42km² - 141 farms
3 main agricultural chains
 Export banana 43% of cropped area – 21 farmers
 Sugar cane 35% of cropped area – 38 farmers
 Tubers & Gardening 16% of cropped area – 81 farmers

Pollution by pesticides at the outlet of Galion River => Herbicides as first pollution linked to current agriculture practices



Objective

Change practices at the watershed scale to reduce pollution

What: Weeding management
Who: Individual and collective
Where: at territorial scale

What do farmers share on a watershed ?

Hypothesis 1: strategies of weeds management at the farm scale

Hypothesis 2: institutional environment of agricultural chain

Socio-technical system analysis

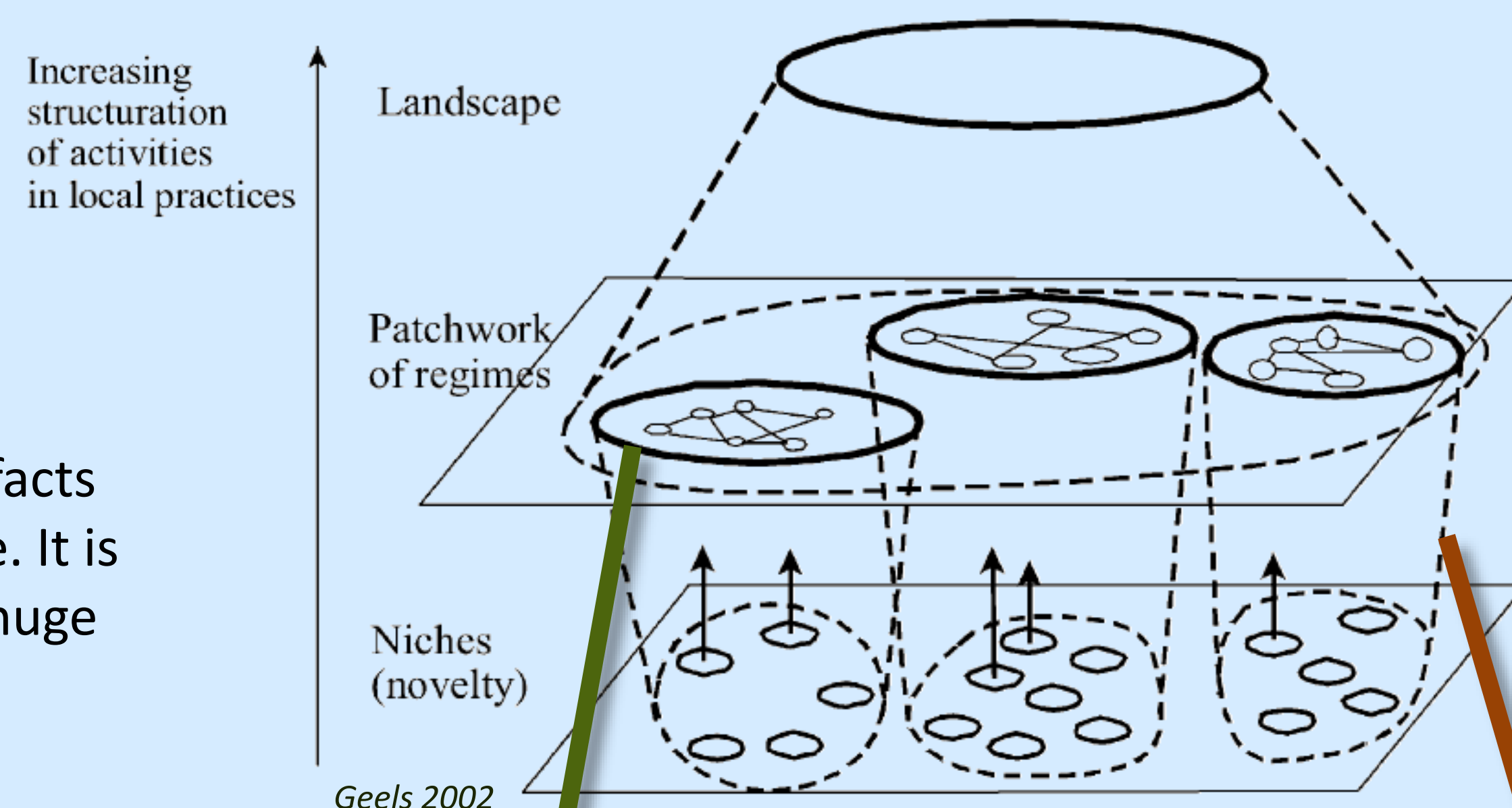
“Socio-technical systems consist of a cluster of elements, including technology, regulation, user practices and markets, cultural meaning, infrastructure, maintenance networks and supply networks (...). Transitions at the level of societal functions thus consist of a change from one socio-technical system to another” (Geels 2005)

Landscape

Material, politic, demographic and ideological backdrop influencing other levels.

Regime

Stable configuration of rules, actors and artefacts creating locks which self-reinforce the regime. It is difficult to influence a regime because of its huge stability.



Niche

Protected space from regime, where innovation can survive and be developed. The niche's configuration is less stable than regime's configuration.

Transition

Landscape bringing pressure to the regime, opening a window of opportunity to niche's innovations.

Weeding strategies, at the farm scale

Understanding the farmer's decision-making process of current agricultural practices (Sebillote & Soler, 1990)

13 farmers investigated on studied watershed (50% of cropped area)

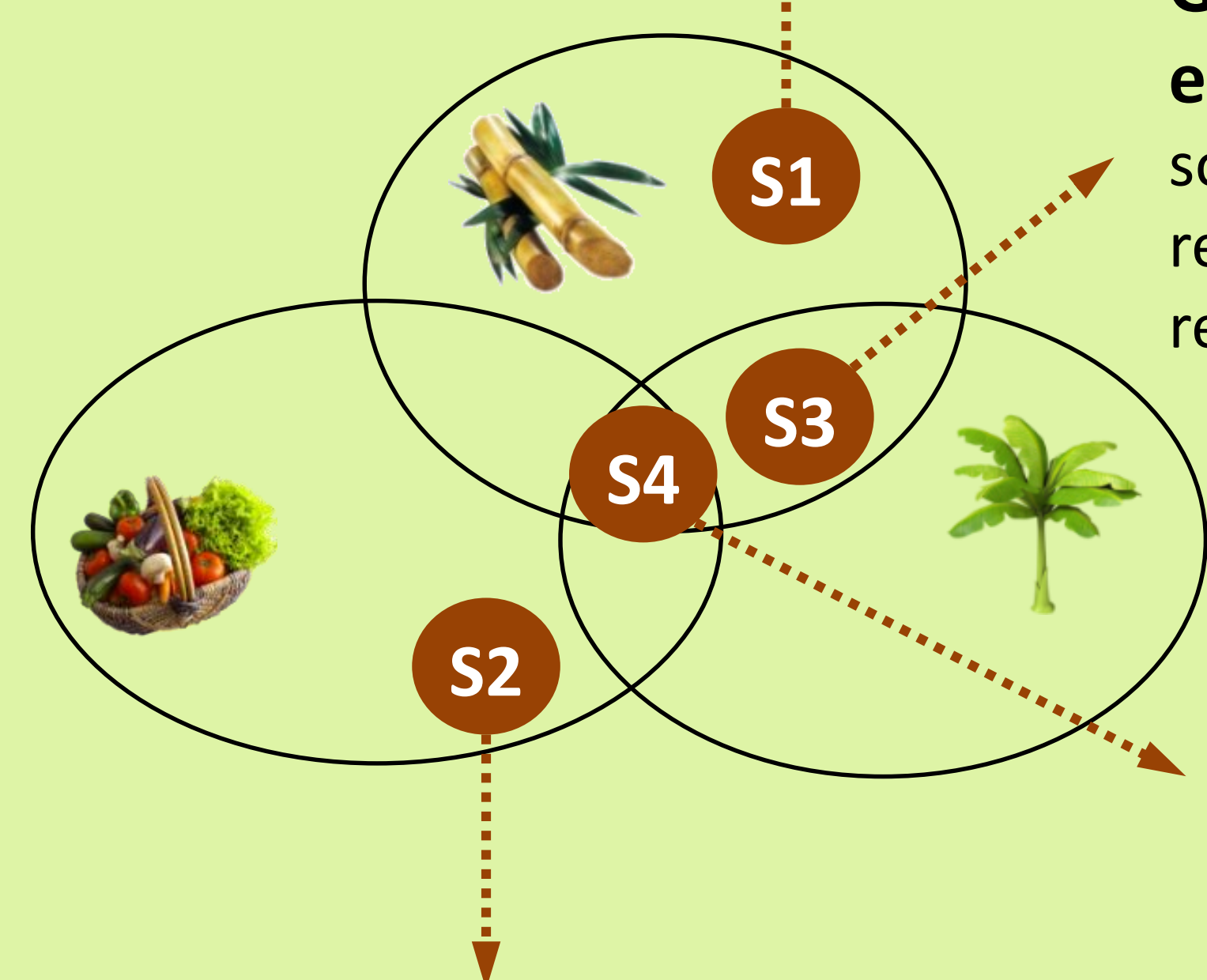
4 farmers' strategies according to decision criteria:

Pre-weeding : (1) limiting herbicide toxicity on crops by pre-weeding, (2) reducing seeds' bank on soil, (3) limiting access of weeds to resources

Good image of Innovation and efficiency : (1) reducing seeds' bank on soil, (2) limiting access of weeds to resources, (3) selecting flora to limit resistant weeds

Planned weeding to facilitate work management: (1) according to the planning of farm activities, (2) reducing seeds' bank on soil

To preserve soil and plant: (1) limiting herbicide toxicity on crops, (2) soil conservation, (3) weeding is not a priority

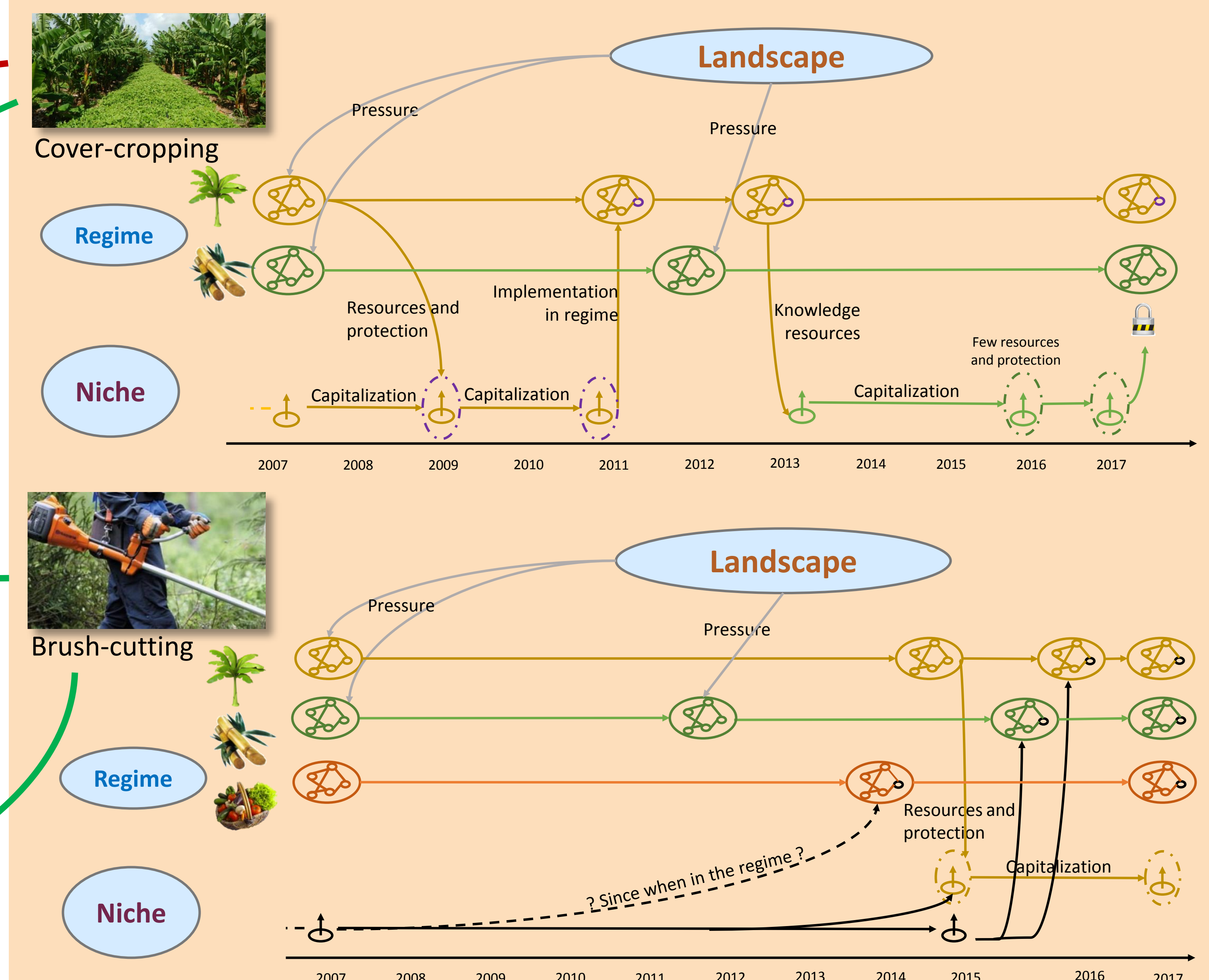


Brakes on farmers' representations

Weeding innovation strategies, at the agricultural chain scale

Identify paths of innovation and path dependencies to highlight actors' strategies in innovation (Belmin 2016)

20 institutional actors interviewed, from niches to regimes, at the Martinique scale



Key conclusions for co-conception at the watershed scale :

- Substitution innovations widely accepted (brush-cutting, small-scale mechanisation)
 - Workshop involving farmers from all agricultural chains
- Innovations involving changes in farmers' strategies require development of niches and evolution of representations (as cover-cropping for S1)
 - Involving farmers into niches' experimentation to change their representations and strategies (as banana chain for cover-cropping)
 - improving capacities of agricultural chains to develop and protect niches (as for sugar cane chain about cover-cropping)
- Workshop involving farmers of different strategies and institutional actors able to support the development of niches